

EXHIBIT 6

MASTER

Nortel's Response to:

CTIA Request For Information - Number Portability

1. Background

On June 27, 1996, the FCC ordered in the matter of Telephone Number Portability (CC Docket No. 95-116, order FCC 96-286 released July 2, 1996) the following for CMRS carriers:

- "We require all cellular, broadband PCS, and covered SMR carriers to have the capability of querying appropriate number portability database systems in order to deliver calls from their networks to ported numbers anywhere in the country by December 31, 1998."¹ Two ways of database access are described.
- "We require all cellular, broadband PCS, and covered SMR carriers to offer service provider portability through out their networks, including the ability to support roaming, by June 30, 1999. ... We believe a nationwide implementation date for number portability for cellular, broadband PCS, and covered SMR providers is necessary to ensure that validation necessary for roaming can be maintained."²
- Interim number portability measures are not required.³
- Service and Location portability are not required at this time.⁴ In addition, changes between wireline service providers and broadband CMRS providers or among broadband CMRS providers are considered changing service providers and not service.⁵
- It is recognized that customers may need to purchase new equipment when switching among CMRS providers.⁶
- The issue of regional number portability databases and their content and administration is assigned to the NANC.⁷

The FCC did not order a specific method for number portability, but did recognize that the LRN method is currently preferred by much of the industry, although not tested.⁸ LRN will be field tested in Chicago no later than August 31, 1997.⁹ The

¹ Paragraph 165.

² Paragraph 166.

³ Paragraph 169.

⁴ Paragraph 181.

⁵ Paragraph 172.

⁶ Paragraph 157.

⁷ Paragraphs 91-102.

⁸ Paragraph 46.

⁹ Paragraph 79.

FCC did establish a list of nine performance criteria which must be met by any long term number portability method as follows:¹⁰

- 1. "support existing network services, features, and capabilities;*
 - 2. efficiently use numbering resources;*
 - 3. not require end users to change their telecommunications numbers;*
 - 4. not require telecommunications carriers to rely on databases, other network facilities, or services provided by other telecommunications carriers in order to route calls to the proper termination point;*
 - 5. not result in unreasonable degradation in service quality or network reliability when implemented;*
 - 6. not result in any degradation of service quality or network reliability when customers switch carriers;*
 - 7. not result in a carrier having a proprietary interest;*
 - 8. be able to accommodate location and service portability in the future; and*
 - 9. have no significant adverse impact outside the areas when number portability is deployed."*
- Additional requirements and issues are included in the order.*

2. Assumptions

LRN will most likely be the long-term number portability method for routing and addressing.

Alignment with projected wireline LRN solution is required.

There will be regional and some state SMS (Service Management System) administrative databases for number portability.

CMRS Providers will query their own or other Service Providers number portability routing databases (SCP - Service Control Point).

SS7 and Intelligent Network capabilities based on existing standards will be required for implementation.

Solutions must allow for variations in implementation by the various carriers to meet the needs of their networks.

¹⁰ Paragraphs 48-59.

The proposed Service Provider portability solution will allow for graceful evolution to service and/or location portability¹¹, if and when ordered. (Location portability is not to be confused with roaming.)

The solution will continue to support wireless as both a roaming and a national/international service.

Nortel's additional assumption

The network that performs the LNP SCP query is the N-1 network.

3. *Goals*

Maintain Cellular roaming not only as it exists today, but to continue its growth nationally and internationally.

Number portability proposals will not compromise currently defined services and features.

Use as much of the existing infrastructure as possible.

4. *Specific Requests for Information*

If responding with a total network solution, please provide an end to end overview description of the proposed architecture for number portability, as noted in Section 5.1. In addition, please provide the specific details as required for Section 5.2 through 5.8.

If responding to specific sections only, i.e. Central database, please provide an overview of how the proposed solution interfaces with the current network architecture.

Please include the changes needed to today's cellular networks and a description of any assumptions made concerning deployment. Also, please identify any deployment options intended.

Nortel's Response/Disclaimer:

The information provided in this RFI is regarding Cellular and PCS networks based on the IS-41 protocol. Furthermore, the information contained in this RFI is of initial observation and may change or be modified in the future.

5. *Proposed Architecture Overview*

The end to end proposal should include but is not limited to:

¹¹ Paragraphs 172 and 174.

- **Network Elements:**

Does the architecture use any one or a combination of the following: STP, SCP, ISCP, IP, MSC, etc. If so, what information and process need to be available at each element? Is more than one database required?

Nortel's Response:

The architecture for an LNP environment consists of STP, SCP/ISCP, and MSC.

Note: The following are definitions of terms used in this proposal.

- LNP routing query refers to the query from the MSC to the LNP SCP to obtain routing information so that a call can be routed to the subscriber's new terminating end office.
- IS-41 registration query refers to the query to a database (could be the same physical database as the LNP SCP database) to obtain the subscriber's new HLR routing. This query occurs only for registration of a roaming subscriber and returns PC/SSN or some other means to route to the subscriber's HLR.

There are several different approaches that can be taken to provide number portability in a wireless (IS-41 network) environment. Only the two most appropriate approaches/alternatives are documented in this RFI.

<u>Alternative</u>	<u>Description:</u>
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- | | |
|---|---|
| 1 | End user obtains a new MIN when ported |
| 2 | End user retains present MIN when ported |
| | Sub options (used to route to the subscriber's new HLR): |
| | a) Launch of the IS-41 registration query from the serving MSC |
| | b) Extension of current MIN-to-HLR GTT to a full 10-digit GTT |

Note: Change MIN when ported, is the alternative of choice. See discussion below

The alternatives above only apply to the registration while roaming issue. The proposed architecture for mobile station call origination and mobile station call termination (also known as call delivery) is the same for the alternatives documented. Thus, for call origination and call termination the changes to support LNP in a wireless environment are common for the two alternations documented.

Scenario: Mobile station call origination (figure 1)

Requirements on MSC: Recommend a standard IS-41 LNP SCP query message invoked from the MSC to the LNP SCP/ISCP. This query is only invoked if a checklist (not an operator call, not 911/411, not toll call, NPA-NXX ported, etc.) is met. When the results are return place the appropriate information in the ISUP IAM message. The ISUP IAM message would have in the called address parameter the LRN (results from query), GAP parameter has the dialed number (DN), and the FCI bit set to flag that a query was perform.

Requirements on STP: No requirements, use existing procedures

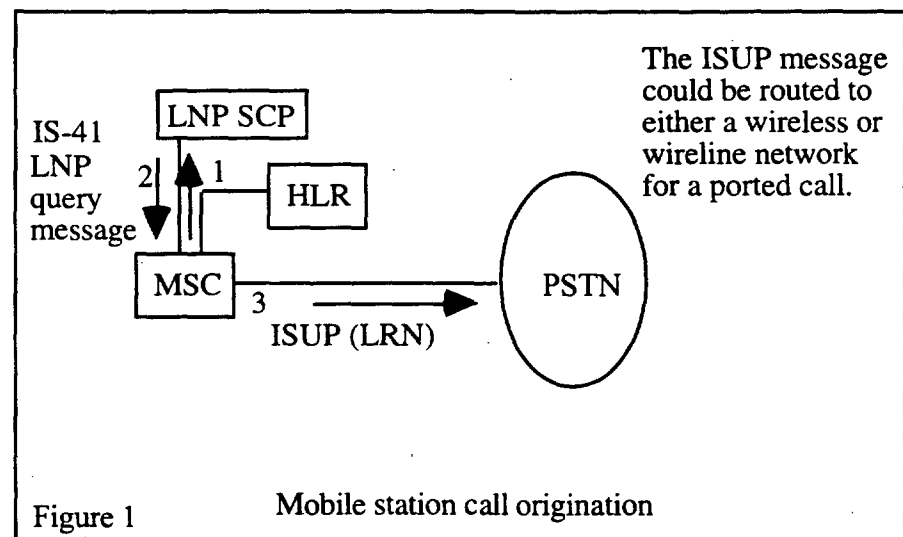
Requirements on LNP SCP/ISCP: Understand an IS-41 LNP query message

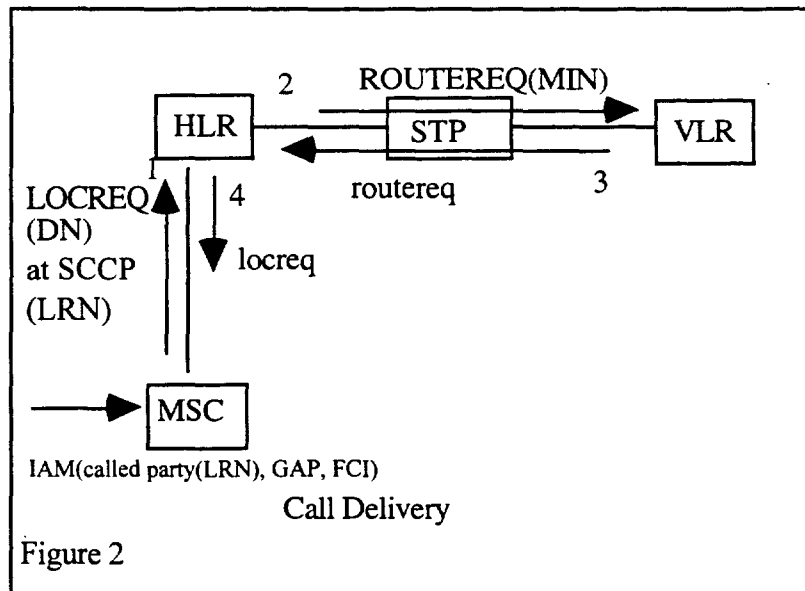
Scenario: Call delivery (figure 2)

Requirements on MSC: The MSC uses the LRN in the incoming ISUP message to route the LOCREQ to the subscriber's HLR. The LRN number is placed in the SCCP layer to perform the correct routing. The dialed digits parameter in the MAP portion of the LOCREQ is populated with the contents of the GAP parameter in the received ISUP IAM message.

Requirements on STP: No requirements, use existing procedures

Requirements on LNP SCP/ISCP: No requirements





Alternative 1

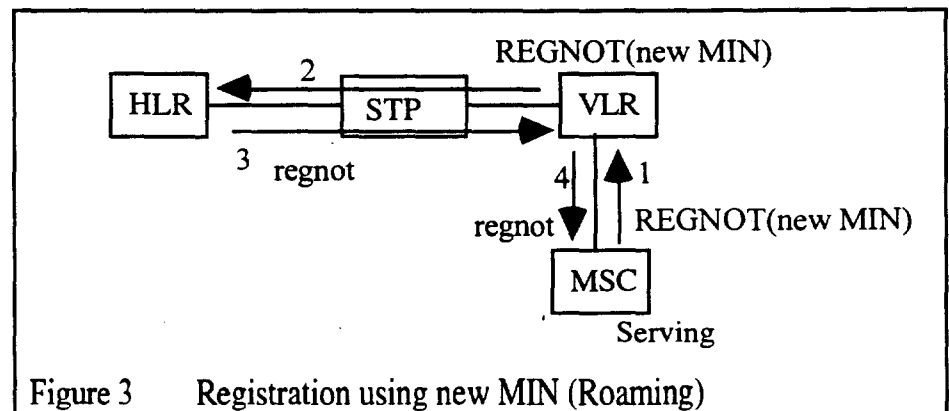
Description: Subscriber gets a new MIN when ported

Scenario: Registration (figure 3)

Requirements on MSC: No requirements, use existing procedures

Requirements on STP: No requirements, use existing procedures

Requirements on LNP SCP/ISCP: No requirements



Alternative 2

Description: Retain the MIN when a subscriber is ported

Standards required: With this alternative (the same MIN is retained when ported) there are two sub options (a and b) to this alternative. One option

is to perform 10-digit MIN-to-HLR GTT during roaming registration to get to the subscriber's new HLR. The other option requires a new IS-41 message to be standardized:

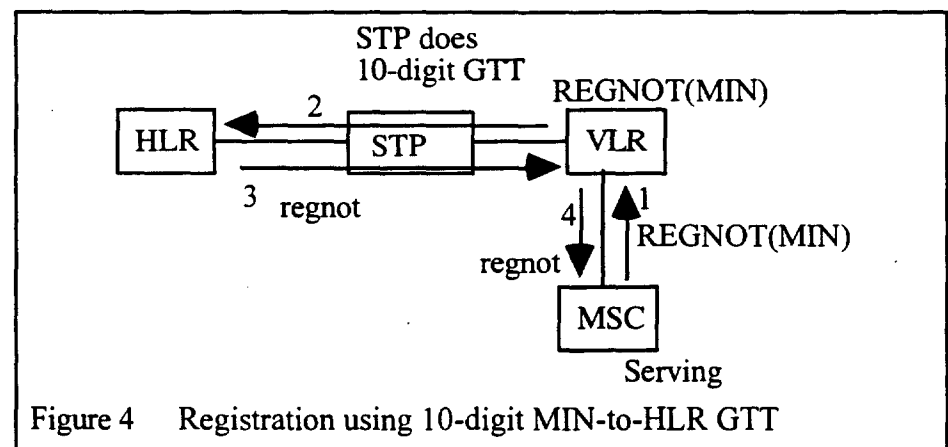
- New IS-41 SCP registration query and return messages between MSC and database (could possibly be the LNP SCP database). This message returns the PC/SSN number (can be some other means of routing information) for the subscriber's HLR to be used to route the REGNOT message from the serving network to the subscriber's new HLR.

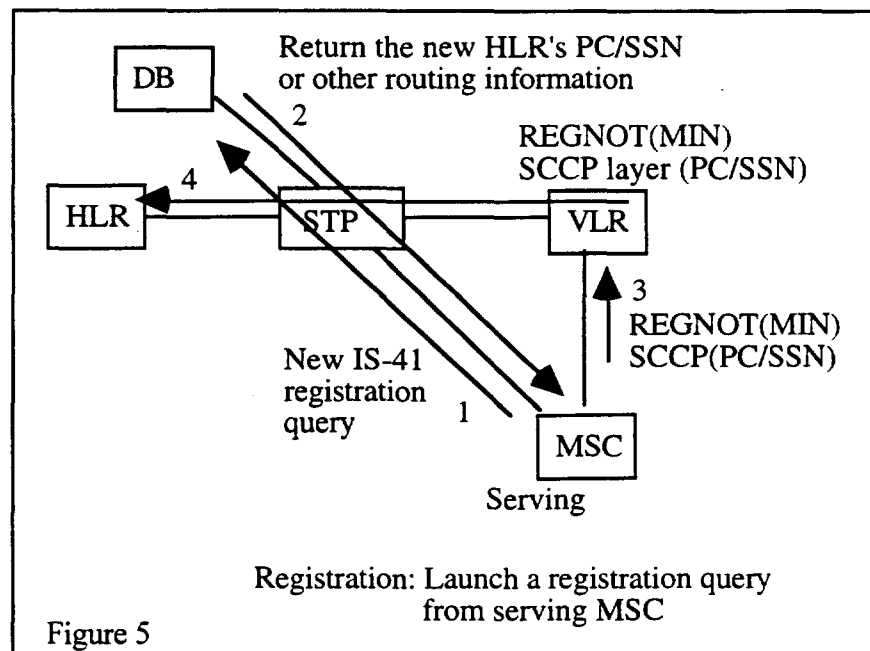
Scenario: Registration (figure 4 and figure 5)

Requirements on MSC: If using the sub option that uses 10-digit MIN-to-HLR GTT there is no requirement (see figure 4). If using the sub option that routes the REGNOT based on PC/SSN number in the SCCP layer, this requires the MSC to send IS-41 registration query message to a database or possibly the LNP SCP database to obtain the PC/SSN (or some other routing information) of the HLR. Once the PC/SSN information is obtained the REGNOT is then routed to the subscriber's HLR with the PC/SSN number placed in the SCCP layer. (See figure 5 for PC/SSN number sub option.)

Requirements on STP: If using the sub option that uses 10-digit MIN-to-HLR GTT the STP is required to do the 10-digit GTT (see figure 4). No requirements if the sub option using PC/SSN is used.

Requirements on database: If using the sub option that uses 10-digit MIN-to-HLR GTT no requirements. If using the sub option that requires PC/SSN number, the database must understand an IS-41 registration query message (see figure 5).





- **Triggering:**

Identify any trigger mechanisms and protocols used, and at which points in the network for this architecture? (ITU IN CS 1R, ANSI IN, AIN, WIN?)

Response:

For initial LNP deployment no trigger is required. The query to the LNP SCP database is based on a checklist. If the checklist requirements are met an LNP query is performed. The checklist would be identical to that on the wireline. The reason for no trigger is, it is believed that for every call origination, if the trigger mechanism is utilized it would always be armed.

If an IS-41/WIN query message(s) is used, the LNP SCP database must support the IS-41 protocol.

The query message to the LNP SCP should be initiated directly from the MSC to the LNP SCP database and not a query tandem from the MSC through the HLR/VLR to the SCP.

An alternative to the IS-41/WIN LNP query message is to deploy/support a subset of AIN 0.1/0.2 in the MSC. The subset of AIN to be used is the minimum required to support only the LNP query.

- **Gateway Requirements:**

Are there requirements for a new gateway function for wireless networks?

Nortel's Response:

The gateway MSC appears to include the same requirements as the home MSC for mobile subscriber termination.

- **Network Routing Number Entity:**

Under the LRN process to which network element does the network routing number point? (MSC-Home, HLR, MSC-Gateway, mobile network gateway.)

Nortel's Response:

The LRN routing number should point to the new MSC-Home or gateway MSC.

- **Central Database:**

Is a central database for wireless use required for identification of HLRs or are there other methods available?

Nortel's Response:

If the MIN is changed when a wireless subscriber is ported the LNP SCP database may be the only database required for number portability.

If the MIN is retained when a wireless subscriber is ported a separate database is required. The database would have the PC/SSN number of the ported subscriber's new HLR. It is also possible to have the PC/SSN number in the LNP SCP database. The requirements are the LNP SCP database understands IS-41 messages, the query based on MIN lookup (for registration) and not DN, and the LNP SCP database is administered to support an PC/SSN number.

- **SS7 Global Titles:**

Identify any impacts on current SS7 Global Title processes. (MIN to MSC, MIN to HLR, IMSI to MSC, IMSI to HLR?)

Nortel's Response:

Based on the two alternatives outlined in the network entity section only the second alternative (MIN is retained when a subscriber ports) would require 10-digit MIN-to-HLR GTT. Note, alternative two can be implemented either with 10-digit GTT or standardize a new IS-41 routing message to the LNP SCP or a separate database.

- **System performance:**

Identify any expected performance implications/impacts on: normal call processing, post dial delay, registration, authentication, roaming?

Nortel's Response:

Call processing: Call processing will require additional processing time due to the post-LNP and the pre-LNP processing for call origination.

Post dial delay: Post dial delay will increase if the LNP query has to be processed/tandem through the HLR. This post dial delay will be the accumulation of the LNP query and the HLR processing. Note, the two alternatives outlined in the network entity section does not recommend the query to be tandem through the HLR.

On mobile station call origination when the call is to a ported number and the LNP query is not tandem through the HLR there will be additional post dial delay due to the LNP query only. The cost will be nearly constant for each mobile station call origination to a ported number.

Additional post dial delay on initial system access (This is the case when the subscriber attempts to make a call and registers in a serving network for the first time.): If the MIN is changed when a subscriber is ported post dial delay will not change. If the MIN does not change, post dial delay will increase during the registration process because either the 10-digit MIN-to-HLR GTT or the additional database query required to determine the subscriber's new HLR. (See network entity section)

Registration: If the MIN is changed when a subscriber is ported the same procedures used today to accomplish registration will be used in an LNP environment without modification. If the MIN is not changed either 10-digit MIN-to-HLR GTT is required or a new IS-41 registration query message is needed.

Authentication: It is believed that an A-key will need to be reloaded into the mobile station and in the authentication center. Further investigation and analysis are required.

Roaming: If the MIN is changed when a subscriber is ported no impact on the existing procedure and can continue to be used without modification. If the MIN is not changed then the LRN number received in the ISUP IAM for the incoming call can be used to route a LOCREQ message from the MSC to the HLR. The LRN number is placed in the SCCP layer to accomplish the routing of the LOCREQ to the new HLR

5.2 Network Functionality

Please include a detailed description of each network functionality with the associated call flows and involved network elements.

5.2.1 Registration:

How should mobile registration be accomplished under number portability?

Nortel's Response:

If the MIN changes when a subscriber port, the registration can continue to be accomplish with the MIN. No impact on the registration because the existing procedures will continue to be used.

If the MIN is not changes when a subscriber is ported either 10-digit GTT must be done or a new IS-41 registration procedure must be standardized.

Given that today we use the MIN which is currently the Mobile Directory Number (MDN) and that we have agreed to move to the use of IMSI with the new digital technology, what process should be used to register mobiles under number portability?

Nortel's Response:

When a wireless subscriber changes service provider, the identity of the mobile station should be changed to conform to an identity that exists within the numbering domain associated with that provider. When the mobile station registers, the REGNOT may be routed to the HLR using existing MIN-to-HLR and IMSI-to-HLR GTT.

Now that the MDN (and consequently the MIN based on today's use) could be ported to or from another provider including wireline, is there a solution to avoid changing the imbedded base of analog phones?

Nortel's Response:

If a wireless number is ported to a wireline network the same mobile DN can be used.

Could a process separating MIN and MDN be used?

Nortel's Response:

Today's wireless IS-41 networks can have distinctive MIN and DN numbers.

Could we use a process based on Mobile Station Identification (MSID) e.g. IMSI plus pseudo-IMSI for the MDN as MIN based phones?

Nortel's Response:

There may be a possible alternative to using a pseudo-IMSI (example 31000 + 10-digit MIN) but this alternative has the same problems as the MIN and DN being identical. Thus, this is possible but not recommended.

Is there a solution that avoids extensive ten digit Global Title Translations (GTT) for routing Mobile Application Part messages?

Nortel's Response:

If the MIN is changed when a subscriber is ported, this will keep from performing 10-digit GTT. If the MIN is not changed when a subscriber is ported by adding an additional IS-41 message to obtain the ported subscriber's HLR PC/SSN number can also be used to avoid performing 10-digit GTT.

What are the international implications?

Nortel's Response:

The IMSI would support international roaming.

Describe the process flow and protocol implications. Describe the impacts on all network elements. Include the implications on current standards, i.e. IS-41, IS-136, TDMA, CDMA, GSM.

Nortel's Response:

The response throughout this document address only IS-41 based protocol and not the GSM protocol. See network entity section.

5.2.2 Authentication

How will authentication be supported in a Service Provider, Number Portability environment?

Nortel's Response:

The exact impact requires further investigation and analysis. It is believed that an A-key will need to be reloaded into the mobile station and in the authentication center.

5.2.3 Call Handling

5.2.3.1 Call Origination on MSC

- *Can a determination be made that the call is to another mobile for potential services and call routing efficiencies?*

Nortel's Response:

It is believed that if the checklist is met then an LNP query should be performed to determine where to route the call to.

- *Will the MSC use the SS7 Call Completion to Portable Number (CCPN) network capability?*

Nortel's Response:

The MSC will use the SS7 Call Completion to Portable Number (CCPN) method of using the LRN and ISUP parameters in the IAM (GAP and FCI) to support LNP.

- *How is the appropriate subscriber information - ANI (charge number) and calling party number correctly populated*

Nortel's Response:

No changes are required to ISUP or MF signaling due to LNP for the calling party.

5.2.3.1.1 To Wireline

What changes need to be made to allow the MSC to do the LNP query for a local call?

Nortel's Response:

The MSC must perform the query, either an IS-41/WIN message or an AIN LNP query message to the LNP SCP. To support IS-41/WIN query a message must be developed that route the query directly to the LNP SCP and not to the HLR which in turns tandem the message to the LNP SCP.

The SCP LNP database must understand IS-41/WIN messages.

How will the MSC interact with the routing databases when defined?

Nortel's Response:

Further investigation and analysis are required but it is initially believed no impact.

How is the call processed if the call is beyond the local area?

Nortel's Response:

The wireline implementation of LNP is to allow the N-1 network to perform the query when the call is beyond the local area. This principle should apply to wireless networks where the N-1 network performs the LNP query.

What types of triggers are used?

Nortel's Response:

No trigger for the initial deployment of LNP is required. Based on a checklist (same checklist as wireline) a decision is made to determine if a query is required. If a query is required an IS-41/WIN message or AIN LNP query message is sent to the LNP SCP database.

The reason for suggesting no trigger for the initial deployment is because, it is believed that if there was an LNP trigger, it would always be armed. Then based on a checklist a query would be sent.

What are the protocol impacts - IS-41, IS-652, etc.?

Nortel's Response:

This is a call to a wireline number ported to another wireline network. The impact to IS-41 is the new IS-41 LNP query message that is from the MSC to the LNP SCP database.

The responses in this RFI are only from an IS-41 networking perspective and not IS-652.

Are there efficiencies that can be applied?

Nortel's Response:

The same methods and procedures would be used as when a wireline subscriber calls a wireline number ported to another wireline network.

5.2.3.1.2 To Wireless

Are there efficiencies which can be developed for delivery to a wireless user or must the procedure be the same as for wireline delivery?

Nortel's Response:

It is believe that if the checklist is met then an LNP query should be performed to determine where to route the call to.

An efficiency besides the checklist method is to perform the QoR (Query on Request) method. The QoR would potentially reduce the number of LNP queries.

What are the protocol impacts and performance implications. Can efficiencies be implemented?

Nortel's Response:

The same impact to wireless networks as on wireline networks for the protocol and performance implications. The ISUP IAM message will include additional parameters: GAP, FCI, and the existing calling party address to include the LRN.

Can we avoid the trunking to the home location and then trunking to the visited location?

Nortel's Response:

This requires additional investigation and research.

How is the location request message routing handled? (e.g. GTT at STPs, GTT to HLR,...)

Nortel's Response:

If the MIN is changed when the subscriber ports, the existing procedure can be used without modification. If the MIN is not changed when the subscriber ports then the LRN in the incoming ISUP IAM message can be used to route the location request message to the HLR. The LRN number would be placed in the SCCP layer to route the location request message to the correct HLR.

5.2.3.2 *Call delivery to Mobile Station*

How will call delivery to a mobile station be accomplished?

Nortel's Response:

If the MIN is changed when the subscriber is ported the existing procedures can be used to perform call delivery without modification. If the MIN is not changed when a subscriber is ported then the LRN received in the ISUP IAM can be used to accomplish call delivery. The LRN would be placed in the SCCP layer to route the LOCREQ message from the MSC to the new HLR.

Will a network routing number be assigned to each MSC?

Nortel's Response:

Each MSC would be assigned a network routing number (LRN).

If efficiencies are applied, can we avoid triggering the LNP processes in routing to the termination location?

Nortel's Response:

The N-1 network performs the LNP query. The query is initiated only if the checklist requirements are met.

How is the location request message routing handled? (e.g. GTT at STPs, GTT to HLR,...)

Nortel's Response:

This requires additional investigation and research. But, it is believed that the message routing is handled as before LNP.

5.3 *Roaming Issues*

How will the roamer tables be handled with number portability?

Nortel's Response:

No change if the MIN changes.

What are the implications to performance, protocols, and architectures?

Nortel's Response:

See discussion in the network element section on the alternatives.

How will roaming with Mexico and Canada be accomplished?

Nortel's Response:

There should be no impact to Canada because they use the NANP numbering plan assuming Canada supports LNP. There are existing issues with Mexico dialing plan that must be resolved before roaming with LNP is possible.

How would roaming with other countries using the same technology work?

Nortel's Response:

IMSI would be the preferred method when roaming with other countries, but the concern/issue is how to deal with the installed base of MIN phones.

5.4 Database issues

What are the implications of databases to our networks?

Nortel's Response:

It is recommended to use SS7 connectivity. The implication to the network to interface with the database(s) requires additional SS7 connectivity if the recommendation is followed.

What wireless information should be added to the currently proposed SMS and SCP databases?

Nortel's Response:

If the MIN is changed when a subscriber ports no additional information may be required for wireless. If the MIN is not changed when a subscriber ports a separate database or the LNP SCP database may need to include PC/SSN number for the subscriber's HLR. Further investigation and analysis are required.

Should wireless develop their own database for each HLR location?

Nortel's Response:

Further investigation and analysis are required.

Is the development of mobile station identification database an issue? Does it address administration?

Nortel's Response:

No response additional investigation and analysis are required.

What are the implications of using another carrier's database or query process?

Nortel's Response:

The implication of querying another carrier's database to perform an LNP query is technically feasible, the decision on interconnection and business arrangements such as billing will need to be addressed.

5.5 Mobile Station Identification issues

What should our long term identification method be?

Nortel's Response:

IMSI

Should we focus on IMSI as the identification?

Nortel's Response:

Yes, this will support international roaming and number portability.

Can we transition from MIN to IMSI gracefully?

Nortel's Response:

From a networking perspective graceful transition is possible with the IS-41 standard. It supports both MIN and IMSI concurrently in IS-41D.

Would it be possible to use a pseudo-IMSI based on MIN?

Nortel's Response:

Using a pseudo-IMSI based on MIN may be possible but the pseudo-IMSI (example: pseudo-IMSI equal 31000 + 10-digit MIN) may have the same problem as today's MIN and DN problem when they are the same.

Could a process separating MIN and MDN be used?

Nortel's Response:

This is possible today.

Can IMSI be used for other processes rather than MIN?

Nortel's Response:

No response this requires further investigation and analysis.

5.6 Service Interactions

5.6.1 Over the Air Activation (OTA)

How will OTA work given number portability?

Nortel's Response:

It is believed that OTA will work in a number portability environment but more investigation and analysis is required.

If we changed to IMSI, can an IMSI be changed via OTA if the customer changes providers or wants another provider upon activation?

Nortel's Response:

Yes

5.6.2 Short Message Services

How will short message service operate under number portability?

Nortel's Response:

The exact impact is unknown, if impacted at all, thus, requires investigation and analysis.

Are there implications for short message service protocols?

Nortel's Response:

Require further investigation and analysis.

5.6.3 Data Services

How will data services operate under number portability?

Nortel's Response:

Require further investigation and analysis.

Are there implications for the protocols?

Nortel's Response:

Require further investigation and analysis.

5.6.4 Emergency Services

How will emergency services be impacted by number portability?

Nortel's Response:

Further investigation and analysis is required

Can Enhanced-911 be supported in a Service Provider Number Portability environment? What are the impacts?

Nortel's Response:

Further investigation and analysis is required

5.6.5 Operator Services

What are the impacts on Operator Services?

Nortel's Response:

No response

5.6.6 Other impacts on Existing Services and Features

What are the impacts on IS-52 services, e.g. CLASS type services?

Are there any existing or planned services/features which are impacted by number portability not covered above? Please describe.

Nortel's Response:

There will most likely be impacts to existing and planned services/features. The impact is unknown and requires investigation and analysis.

5.7 Operational Support Systems

5.7.1 Service Management System (SMS)

Please identify any wireless requirements for the SMS. Also, identify any needed interfaces with the SMS or its databases. Please identify any unique needs of the wireless networks over wireline.

Nortel's Response:

This section would more appropriately be answered by SMS manufacturer, but depending on the alternative chosen as discussed in the network element section additional information may be required for

wireless. The SMS should administer the additional fields of PC/SSN for the new HLR.

5.7.2 Billing

Please identify the proposed methods for billing under number portability. What should the identifier be? How will call detail records change? What will be used for V and H coordinates?

Nortel's Response:

From a MSC manufacturer perspective the CDR (Call Detail Record) may need to be enhanced. The exact changes required are unknown and require additional investigation and analysis. The actual billing is more appropriately answered by the billing vendors.

5.7.3 Maintenance Systems

How will existing maintenance systems be impacted by number portability and its proposed architecture, performance and protocol changes?

Nortel's Response:

Some impact, the exact impact is unknown and requires investigation and analysis.

5.7.4 Customer Care

How will our customer care systems interact with number portability impacts? (e.g. 611 routing) Will they interact with the SMS, other databases, billing systems effectively?

Nortel's Response:

No response, more appropriately to be answered by customer care centers.

5.8 Timing

There are currently two deadlines imposed on CMRS:

- *December 31, 1998, to deliver calls to ported numbers nationally.*
- *June 30, 1999, for full number portability for CMRS including roaming.*
- *Respondants are asked to comment on times required to complete the standards as well as develop, test, and implement the solutions proposed in order to meet these dates.*

Nortel's Response:

The alternative/solution selected will dictate the time required to complete the development, test, and implementation on the MSC.

There are common changes required to support LNP using either alternative one (change MIN when porting) or alternative two (keep MIN when porting). The changes that are common are for mobile station call origination and call delivery scenarios. They are:

- New IS-41 LNP SCP query and return messages between MSC and LNP SCP database to obtain LRN routing information when the mobile station originates a call. Recommend the LNP SCP to understand IS-41 messages.
- Call delivery requires the LRN in the incoming ISUP IAM message to be placed in the SCCP layer routing field to route the LOCREQ message from the MSC to the subscriber's new/correct HLR.

Alternative 1

The advantage of this alternative (change MIN when porting) is that it is easy to implement and administer, little changes, and allows the same IS-41 messages to be used for both IMSI and MIN based phones concurrently. Thus, this allows from a networking perspective to deploy IMSI and to continue to support the large installed based of MIN phones. Furthermore, there are no modifications to either the MSC, STP, or SCP/ISCP for registration. For call delivery with this alternative no modifications are required to either STP or SCP/ISCP. The MSC requires minor changes for call delivery. See network entity section. This alternative may be expedited through widespread network support of the Over The Air (OTA) activation capability. The disadvantage is that the mobile station user's terminal identity must be altered.

Alternative 2

With this alternative (the same MIN is retained when ported) there are two options to this alternative to get the subscriber's new HLR:

- a) Perform 10-digit MIN-to-HLR GTT during registration (roaming)
- b) New IS-41 SCP registration query message

New IS-41 SCP registration query and return messages between MSC and database (could possible be the LNP SCP database). This message returns the PC/SSN or other routing information for the subscriber's HLR to be used to route the REGNOT message from the serving network to the subscriber's new HLR. If the new IS-41 SCP registration query message is routed to the LNP SCP database the database must understand IS-41 messages and be able to query on the MIN and not the DN as during an IS-41 LNP SCP query. Instead of routing to the LNP SCP database it may be a separate database. If it is a separate database or the LNP SCP database both require administration.

6. Fraud Issues

6.1 Fraud Management

How will number portability impact fraud management systems? Can these systems interact with the new environment in real time? What are the performance impacts?

Nortel's Response:

This area requires further investigation and analysis.

6.2 **LAES (Lawfully Authorized Electronic Surveillance)**

Are changes needed to support LAES requirements?

Nortel's Response:

This requires further investigation and analysis.

7. **References**

The following representative material may be helpful in the development of responses:

- [1]. Industry Carriers Compatibility Forum, Industry Numbering Committee (INC) report titled *INC Report on Number Portability* document number INC 96-0607-013 Issued 7/11/96¹²
- [2]. FCC First Report and Order and Further Notice of Proposed Rulemaking, *In the Matter of Telephone Number Portability* CC Docket No. 95-116, order FCC 96-286.¹³
- [3]. EIA/IS-52-A *Uniform Dialing Procedures and Call Processing Treatment for Cellular Radio Telecommunications*¹⁴
- [4]. TIA/EIA/IS-41C (latest version available)
 - EIA/TIA/IS-41.1-C *Cellular Radiotelecommunications Intersystem Operations: Functional Overview*
 - EIA/TIA/IS-41.2-C *Cellular Radiotelecommunications Intersystem Operations: Intersystem Handoff*
 - EIA/TIA/IS-41.3-C *Cellular Radiotelecommunications Intersystem Operations: Automatic Roaming*
 - EIA/TIA/IS-41.4-C *Cellular Radiotelecommunications Intersystem Operations: Operations, Administration, and Maintenance*
 - EIA/TIA/IS-41.5-C *Cellular Radiotelecommunications Intersystem Operations: Signaling Protocols*
 - EIA/TIA/IS-41.6-C *Cellular Radiotelecommunications Intersystem Operations: Signaling Procedures*
- [5]. TIA/EIA/IS-136 (latest version available)

¹² Document is available from Kathy Cullen, INC Secretary, 3 Corporate Place, Room 2F309, Piscataway, NJ 08854, phone: 908-699-3245.

¹³ FCC Document availability: Federal Communications Commission, 1919 M Street NW, Washington DC 20554 or via internet at "www.fcc.gov".

¹⁴ TIA Documents availability: Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Phone 800-854-7179 or 303-792-2181, fax 303-397-2740.

- TIA/EIA/IS-136.1 800 MHz TDMA Cellular - Radio Interface - Mobile Station-Base Station Compatibility - Digital Control Channel
 - TIA/EIA/IS-136.2 800 MHz TDMA Cellular - Radio Interface - Mobile Station-Base Station Compatibility - Traffic Channels and FSK Control Channel
 - TIA/EIA/IS-136.1-1 800 MHz TDMA Cellular - Radio Interface - Mobile Station Compatibility - Digital Control Channel
 - TIA/EIA/IS-136.2-2 800 MHz TDMA Cellular - Radio Interface - Mobile Station-Base Station Compatibility - Traffic Channels and FSK Control Channel
- [6]. TIA/EIA/IS-95-A Mobile Station - Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System
- [7]. ANSI/J-STD-007 Personal Communications Services Air Interface Specification (TIA)
- [8]. TIA/EIA/IS-652 PCN to PCN Intersystem Operations Based on DCS 1900
- [9]. EIA/TIA-553 Mobile Station - Land Station Compatibility Specification (ANSI/EIA/TIA-553-89)
- [10]. TIA/EIA/IS-91 Mobile Station - Base Station Compatibility Standard for 800 MHz Analog Cellular
- [11]. TIA/EIA/IS-93 Cellular Radio Telecommunications Ai - Di Interfaces Standard
- [12]. TIA/EIA/IS-637 Short Message Services for Wideband Spread Spectrum Cellular Systems
- [13]. TIA/EIA/IS-683 Over the Air Service Provisioning of Mobile Stations in Wideband Spread Spectrum Systems
- [14]. ANSI Signaling System 7 (SS7) Standards.¹⁵
- [15]. Draft Proposed American National Standard - SS7 - Number Portability Call Completion to a Portable Number - Integrated Text, T1 Letter Ballot 557 (Document T1S1/96-199) closes on September 12, 1996.¹⁶
- [16]. Draft Proposed American National Standard - Intelligent Network, Pending Letter Ballot release in September, 1996 (Documents T1S1.1/96-248R1 (road map to documents), T1S1.1/96-234, T1S1.1/96-235, T1S1.1/96-236, T1S1.1/96-237, T1S1.1/96-238, T1S1.1/96-239, T1S1.1/96-240, T1S1.1/96-241R1, T1S1.1/96-242, T1S1.1/96-147, T1S1.1/96-243, T1S1.1/96-148, T1S1.1/96-244, T1S1.1/96-149, T1S1.1/96-245,

¹⁵ ANSI Standards availability: American National Standards Institute, 11 West 42 Street, New York, NY 10036, Phone: 212-642-4900.

¹⁶ Draft T1 ANSI standards availability: ATIS, T1 Secretariat, 1200 G Street NW, Suite 500, Washington, DC 20005 or on internet at "www.t1.org".

T1S1.1/96-150, T1S1.1/96-246, T1S1.1/96-152, T1S1.1/96-250,
T1S1.1/96-048)

- [17]. Bellcore Letter IL-96/02-015 *Assignment of International Mobile Station Identities (IMSI)*¹⁷
- [18]. Bellcore *Local Number Portability Capability Specification* , Generic Requirements, GR-2936-CORE
- [19]. ITU-T Recommendation E.212 *Identification Plan for Land Mobile Stations*¹⁸
- [20]. ITU-T Recommendation E.214 *Structure of the Land Mobile Global Title for the Signalling Connection Control Part (SCCP)*
- [21]. ICC *Generic Requirements for SCP Application and GTT function for Number Portability* Issue 0.31, March 24, 1996¹⁹
- [22]. ICC *Generic Requirements for Operator Services Switching Requirements for Number Portability* Issue 1.1, June 20, 1996²⁰
- [23]. ICC *Generic Switching and Signaling Requirements for Number Portability* Issue 1.02, June 17, 1996²¹

8. CTIA reserves the right to publish or to not publish any information made available under this request for information.

¹⁷ Bellcore Document availability: Bellcore, Customer Service, 8 Corporate Place, Room 3A-184, Piscataway, NJ 08854-4156.

¹⁸ ITU Recommendation availability: International Telecommunications Union, Geneva, Switzerland.

¹⁹ ICC Document availability: Via internet only, "www.ameritech.com/documents/scp".

²⁰ ICC Document availability: Via internet only, "www.nortel.com/lnp".

²¹ ICC Document availability: Via internet only, "www.bell-labs.com/user/jlichter".

RESPONSE MATRIX
Request for Information

Company Name:

Number Portability

Section	Question/Subject	Response Included	No Response
5.6	Service Interactions	✓	
5.6.1	Over the Air Activation (OTA)	✓	
5.6.2	Short Message Services	✓	✓
5.6.3	Data Services		✓
5.6.4	Emergency Services		✓
5.6.5	Operator Services		✓
5.6.6	Other impacts on Existing Services and Features	✓	
5.7	Operational Support Systems	✓	
5.7.1	Service Management System (SMS)	✓	
5.7.2	Billing	✓	
5.7.3	Maintenance Systems	✓	
5.7.4	Customer Care		✓
5.8	Timing	✓	
6.1	Fraud Management		✓
6.2	LAES (Lawfully Authorized Electronic Surveillance)		✓

RESPONSE MATRIX

Request for Information

Number Portability

Company Name:



Section	Question/Subject	Response Included	No Response
5.1	Proposed Architecture Overview	✓	
	Network Elements	✓	
	Triggering	✓	
	Gateway Requirements	✓	
	Network Routing Number Entity	✓	
	Central Database	✓	
	SS7 Global Titles	✓	
	System Performances	✓	
5.2	Network Functionality	✓	
5.2.1	Registration	✓	
5.2.2	Authentication	✓	
5.2.3	Call Handling	✓	
5.2.3.1	Call Origination on MSC	✓	
5.2.3.1.1	To Wireline	✓	
5.2.3.1.2	To Wireless	✓	
5.2.3.2	Call Delivery to Mobile Station	✓	
5.3	Roaming Issues	✓	
5.4	Database Issues	✓	
5.5	Mobile Station Identification Issues	✓	